Maternal work absence: a longitudinal study of language impairment and behavior problems in preschool children

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negative short- and long-term consequences for the financial and overall health and well-being of mothers and their families.

The dual-earner family has been a central political ambition in Norway and other welfare-oriented countries since the early 1970s, and the past few decades have seen an unprecedented increase in maternal employment throughout Europe and the United States. Still, mothers have lower employment and higher sick leave rates than fathers across most of these countries (Laaksonen et al., 2010; Melchior, Niedhammer, Berkman, & Goldberg, 2003), including Norway (Mastekaasa, 2000). Children's disabilities or special health care needs (McPherson et al., 2004) might constitute an important risk factor for this maternal work absence, forming the nucleus of much work–family conflicts

Caregiving constitutes a normal part of being a mother but is likely to take on a different significance when a child has special needs and might become a "fertile ground for persistent stress" (Pearlin, Mullan, Semple, & Skaff, 1990, p. 583). Over time, additional stress factors might lead to compromised health and necessitate various employment-related adjustments. The notion that child health and behavior affect maternal behavior is central within transactional and family systems theories (Bronfenbrenner & Morris, 1998; Lazarus & Folkman, 1984), and a number of theoretical models describe the impact of stress on caregivers. Extensive caregiving commonly requires rearrangement of priorities and redirection of energy to optimally manage the child's disability and to juggle the caregiver role within the requirement of everyday life, personal, and contextual (e.g., social support, finances, health care, and education facilities) resources (Raina et al., 2005). Although extra care (e.g., special education, supervision, medical visits) might constitute an important ingredient in promoting optimal development for the child, it is likely to divert resources from other purposes and might result in stress, compromised health, exhaustion, absenteeism, reduced work hours, or cessation of paid work altogether (DeRigne & Porterfield, 2010). Because mothers are typically the primary caregivers, they are likely to shoulder the bulk of these added responsibilities (Baker & Drapela, 2010; DeRigne, 2012). Empirical evidence has also demonstrated associations between caregiving and both maternal health and employment outcomes. A majority of mothers tend to adjust their work participation to meet family goals, making employment decisions in response to an intricate web of interconnected relational issues (Holmes, Erickson, & Hill, 2012; Mainiero & Sullivan, 2005), including their children's health and behavior (DeRigne, 2012; Gordon, Rosenman, & Cuskelly, 2007). A number of studies have also documented associations between children's special care needs and lowered maternal employment rates (DeRigne, 2012), with more mothers working part time (Gordon et al., 2007) or leaving work altogether (Nes et al., 2013), despite not having a weaker desire for work (Gordon et al., 2007), with the more severe child care conditions most strongly related to lower employment rates (DeRigne, 2012; Montes & Halterman, 2008), and the employment differences becoming more pronounced with child age (Hauge et al., 2014).

Extensive caregiving is also likely to influence both maternal mental and somatic health. Mothers of children with special needs have been shown to be more likely to suffer from anxiety and depressive disorders than fathers or mothers of typically developing children (Brehaut et al., 2009). These differences commonly ensue from the chronic strain involved in the caretaker role as well as from emotional reactions and concerns evoked by the child's condition. The cumulative effect of multiple daily caregiving stressors has been shown to adversely affect wound healing and to promote elevations in inflammatory markers associated with depression, cardiovascular disorders, frailty, and mortality (Gouin, Glaser, Malarkey, Beversdolf, & Kiecolt-Glaser, 2012; Mausbach, Patterson, Rabinowitz, Grant, & Schulz, 2007). Despite the fact that care responsibilities are closely associated with these health conditions, which are major reasons why people in the general population take sick leave, few researchers have examined sick leave rates for mothers of children with special needs, and, to our knowledge, none have used physician-certified register-based information. Previous studies have typically been characterized by major shortcomings such as the data being based on self-report only or on cross-sectional data, and the investigation of the impact of specific child diagnoses of very low prevalence (e.g., autism, Down syndrome). Other studies have included heterogeneous samples of children with widely

varying age and health conditions and thus widely varying care needs. To address some of these concerns, in this study we examined some of the most common problems in preschool children, namely, language impairment with and without co-occurring behavior problems.

Language Impairment in Children

Language impairment constitutes one of the most prevalent conditions observed in preschool children (Heim & Benasich, 2006). The prevalence has been estimated to range between 7% and 17.5% in children age 18–36 months (Horwitz et al., 2003; Tomblin et al., 1997), with the prevalence found to be greater in boys and with variation in estimates related to the child's age, the severity of the impairment, cultural background, and parental education (Tomblin et al., 1997). More generally, neurobiological and genetic factors seem to play a role in the etiology (Hayiou-Thomas, Dale, & Plomin, 2012; Zubrick, Taylor, Rice, & Slegers, 2007). In addition, factors such as prematurity and low birth weight are regarded as putative risk factors, along with parenting stress and other maternal factors (e.g., education, depression), with the evidence regarding most perinatal factors being somewhat inconsistent (Harrison & McLeod, 2010; Stokes & Klee, 2009).

Children typically utter their first words around age 12 months and begin to combine words prior to 2 years (Zubrick et al., 2007). Their vocabulary skills might vary considerably, and some children are late bloomers who catch up with their peers by the time they start school (Rice, Taylor, & Zubrick, 2008). Still, early language impairment is considered one of the best predictors of persisting language impairment (Zubrick et al., 2007).

Language impairment has long-reaching effects on reading and language behavior as well as on the corresponding neurocircuits that support linguistic function into school-age years (Preston et al., 2010). Children with language impairment thus commonly manifest poor academic and social (i.e., relational) skills throughout childhood and adolescence, often require extensive special education and special health services, and often present with behavioral and emotional problems (Beitchman et al., 1996; Horwitz et al., 2003; Tomblin et al., 1997). Associations between language impairment and behavioral and emotional problems are particularly strong (Rescorla, Ross, & McClure, 2007). About 50% of children in mental health clinics have been shown to have language impairments, and about 50% of children with language impairments fulfill criteria for a behavioral or emotional disorder (Cohen, 2001; Maggio et al., 2014). For example, in one community sample, children with a language impairment were found to be four times more likely to have externalizing behavior problems at age 30 months than children with typically developing language skills (Horwitz et al., 2003). Previous studies have also found that child behavior problems constitute the single most important predictor of caregiver well-being, both directly and indirectly (King, King, Rosenbaum, & Goffin, 1999; Raina et al., 2005).

Language Impairment and Maternal Work Absence

Caregiving is clearly a transactional process consisting of multiple, interacting factors (Bronfenbrenner & Morris, 1998; Pearlin et al., 1990). A number of theoretical models describe the impact of stress on maternal caregivers, such as the caregiver stress model (Pearlin et al., 1990), according to which employment, health, and sick leave are understood as outcomes of three main interacting components, including context (e.g., socioeconomic factors), primary stressors (e.g., caregiving tasks), and secondary stressors (e.g., role strain such as caregiving–job conflict and intrapsychic strain like depression). Children with language impairment commonly need extra attention, monitoring, supervision, and time-consuming specialized health and education services. They are likely to introduce numerous interruptions, worry, and distractions (i.e., caregiving tasks and strains) that likely create employment challenges (e.g., cessation of work) and compromised caregiver health, potentially resulting in sick leave absences for parents who are employed. Given its high prevalence, its persistence over time, and its association with child behavior problems, language impairment might therefore constitute a considerable risk factor for maternal work absence. In this study, we examined prospective associations between maternal work absence and child language impairment with and without co-occurring behavior problems through preschool years. We used mother-reported data on language impairment and behavior problems at child age

3 years from 33,778 mothers participating in the prospective population-based Norwegian Mother and Child Cohort Study (MoBa). Cohort data were linked to national registry information on employment status and physician-certified long-term sick leave absences. Register data limit the common caveats associated with self-report and loss of follow-up and allow for attrition and sensitivity analyses. Apart from mother-reported data on child language impairment and behavior problems, all child-relevant variables (e.g., birth weight, gestational age, serious congenital anomalies, gender) were obtained from national registers along with demographic variables commonly associated with maternal work absence (i.e., education, parity, age). Because anxiety and depression constitute risk factors for work absence and might influence the mothers' ratings of their children's health and behavior (e.g., negative bias) we also accounted for the mothers' self-reported susceptibility to anxiety and depression.

The Norwegian context is characterized by practically universal governmentally subsidized child care options, and special education commonly takes place in ordinary kindergartens or preschools. Nevertheless, on the basis of previous research on caregiving, health, and employment, we predicted lower employment and higher sick leave rates among mothers who reported language impairment in their child. We expected the risk to be higher for co-occurring problems given that behavior problems have been shown to be particularly closely related to mothers' caregiving strains (King et al., 1999; Raina et al., 2005) and to constitute a barrier to paid employment in mothers of preschool-age children (Nes et al., 2013). We also hypothesized that differences in work absence between groups of mothers remain or increase, given that language impairment generally persists and is associated with social, emotional, and academic problems that often become more pronounced with age. The school-age years also bring a range of social, communicative, and academic shifts that may intensify caregiving strains at this developmental stage.

Method

Sample

This study is based on the MoBa study, which is conducted by the Norwegian Institute of Public Health (Magnus et al., 2006; Nilsen et al., 2009). Participants were recruited from all over Norway between 1999 and 2008. Recruitment occurred through a postal invitation when expecting mothers were scheduled for a routine ultrasound examination at 17–18 weeks of gestation. The women consented to participation in 40.6% of the cases. The MoBa study was approved by the Regional Committee for Medical Research Ethics in southeastern Norway, and informed consent was obtained from each participant. Updated data files are released every summer; the analyses we present in this article are based on Version 7 of the quality-assured data files released for research in 2012.

The MoBa cohort is linked to the Medical Birth Registry of Norway (MBRN), which contains standardized data regarding all pregnancies in Norway from 12 weeks of gestation onward (Irgens, 2000). The registry contains a national identification number for all participants, allowing linkage with employment, benefit, and income registries in the National Insurance Administration, the National Education Database of Statistics Norway, and the Central Population Register. This linkage provided longitudinal data for the children and their mothers, with updates for variables from these registries available through 2011.

For participating mothers with more than one pregnancy in the study, only their first pregnancy ending in a live birth was included ($n = 90{,}680$). Social security data were available through 2011; children in the MoBa were born between 1999 and 2009. Thus, for a complete 5-year follow-up after delivery, only mothers of children born between 1999 and 2006 were eligible. Participants with children born between 2007 and 2009 ($n = 24{,}469$) were therefore excluded, as were mothers who had twins/triplets ($n = 1{,}152$), leaving 65,059 eligible participants. Of these eligible participants, 42.8% ($n = 27{,}826$) had not completed the questionnaire at 3 years, the data from which were used in the present analyses. Participants who had died or emigrated during the follow-up period ($n = 644$, 1.0%) or who had missing responses on all the relevant variables ($n = 872$, 1.3%) were excluded. Last, we excluded mothers whose children were diagnosed with a serious congenital malformation ($n = 1{,}939$, 3.0%) at delivery or by pediatric examination during the initial hospitalization because language impairment might coexist with a number of these more severe conditions. Congenital

malformations are recorded in the MBRN according to the codes of the *International Classification of Diseases* (World Health Organization, 1965), with minor modifications, and include both structural and functional anomalies, including metabolic disorders and chromosomal anomalies (e.g., Down syndrome). The final sample thus included a total of 33,778 mothers.

Measures

Exposure variables. The main study exposure variable, *language impairment*, was measured by Dale et al.'s parent-based assessment of grammar abilities (Dale, Price, Bishop, & Plomin, 2003). The mother was asked to describe her child's language abilities, choosing one of six categories, ranging from no word production to full sentences with complete grammatical markings. Children whose mothers reported minimal expressive language (no word production or only one-word or unintelligible utterances) at 3 years or two- to three-word phrases only, such as "Me got ball" or "Give doll," were rated as having a language impairment. Children who could produce fairly complete sentences or long and complicated sentences were rated as having no language impairment.

Language impairment can be reliably ascertained by child age 24 months (Rice et al., 2008), and parental self-report is commonly found to be a good measure of children's early expressive vocabulary, especially of severe language impairment (Dale et al., 2003). Evidence for the validity of the measure used here has been provided previously (Viding et al., 2004). To explore validity in the MoBa sample more specifically, a subsample of 425 children was administered in-depth assessments as part of an ongoing case–control study of autism spectrum disorders nested within the MoBa cohort (Stoltenberg et al., 2010). Here, screen-positive children with a potential autism spectrum disorder were assessed shortly after completion of the Age 3 questionnaire. The children's scores on the Vineland Adaptive Behavior Scales (Sparrow, Balla, & Cicchetti, 1984), a semistructured interview administered by clinicians who were blind to the maternal reports, were compared with ratings based on mother report in the Age 3 questionnaire. Maternal report and scores on the Vineland communication domain, which constitutes the single standard test score that best correlates with clinical judgments of language impairment (Hall & Segarra, 2007), were highly consistent and yielded a correlation of .84 ($p < .0001$).

Child *behavior problems* at age 3 were measured by maternal ratings on a set of items selected for the MoBa study to measure internalizing and externalizing behavior problems. This set was selected to represent a range of emotional and behavioral problems in 3-year-old children. Items were culled from the widely used Child Behavior Checklist (CBCL/1.5–5; Achenbach, 1992) and the Infant Toddler Social and Emotional Assessment (ITSEA; Carter, Briggs-Gowan, Jones, & Little, 2003). The entire set of CBCL and ITSEA items selected for the MoBa were used to construct psychometrically stronger scales. *Internalizing problems* were measured by 16 items (nine CBCL and seven ITSEA items) reflecting anxiety, emotional reactivity, and somatic problems (CBCL) as well as general anxiety and separation distress (ITSEA). Cronbach's alpha was .65 in the present sample. *Externalizing problems* were measured by 17 items (12 CBCL and five ITSEA items) reflecting attention problems and aggression (CBCL) and peer aggression and aggression/defiance (ITSEA), and Cronbach's alpha was estimated to be .83.

Mothers rated the internalizing and externalizing items on a 3-point Likert scale with the categories "not true," "somewhat or sometimes true," and "very true or often true." Mean sum scores were first standardized for gender and transformed into ordinal categories reflecting typical behavior (reference), moderate behavior problems (>1 SD above the mean), and severe behavior problems (>2 SD above the mean), consistent with other research that has used the CBCL (Achenbach, 1991; Eisenberg et al., 2001, 2009). Because of the sample size and associated power issues, we then constructed a dichotomous measure indicating behavior problems reflecting either internalizing or externalizing behavior problems, or both, using the cutpoint for moderate to severe behavior problems (>1 SD above the mean). Last, we constructed a child condition variable with four categories indicating (a) typical development, (b) language impairment only, (c) behavior problems only, and (d) co-occurring language impairment/behavior problems.

Outcome variables. Work absence was measured as register-recorded employment status and long-term sick leave absence in the period 3–5 years after birth. Employment status is reported annually by employers and recorded in the national employment register. We constructed a categorical variable indicating either employed or not employed (i.e., no employment or less than 4 hours weekly) for mothers when their children were 3, 4, and 5 years. The labor market for mothers is considerably stable in Norway, and approximately 90% of employees have stable jobs (not temporary employment). A majority of mothers are employed in the public sector, and, according to the Norwegian Working Environment Act, parents are entitled to take leave during the child's first year up to a total of 12 months (Rønsen & Kitterød, 2012). Parents cannot be dismissed during pregnancy or maternity/paternity leave. The unemployment rate is also low, varying between 2.4% and 4.4% in the years relevant for this study (women age 17–74 years). Nonemployment is therefore not likely to reflect dismissal due to sick children or unemployment due to lack of job opportunities.

Sick leave is granted for the mother's personal illness and is recorded only for those employed in the given calendar year. *Long-term sick leave* was defined as a certified absence of 8–52 weeks compensated for under the Norwegian Insurance Act in the 3 given calendar years following the child's third birthday. This definition is in general keeping with the one currently being used in Norway. The sickness compensation system in Norway covers 100% of the wage loss from the first day of reported sickness. The employer covers sickness compensation for the first 16 days, and the National Insurance Administration covers it from the 17th day onward, up to a maximum of 52 weeks. The National Sickness Benefit Register, which provided data for the present analyses, contains information on all sick leave absence paid by national insurance (i.e., all certified sickness absences lasting more than 16 calendar days).

Potential confounds. Several factors may affect both language impairment in children and maternal work absence and thus constitute potential confounders. Child-related factors most notably comprise prematurity, low birth weight, and congenital anomalies, and maternal factors typically include the mother's own language abilities, education, stress, and depression (Harrison & McLeod, 2010; Stokes & Klee, 2009). All mothers who had children registered with a serious congenital anomaly were excluded from the data set. Data on *birth weight*, *gestational age*, *parity*, *child sex*, and *maternal age w*ere provided by the MBRN, whereas information on *educational attainment* was provided by the Norwegian National Education Database of Statistics Norway. Birth weight below 2,500 g was coded as low, and the child was categorized as preterm if he or she was born before gestation week 37. Using these two pieces of information (birth weight and preterm status), we constructed a dichotomous measure of perinatal risk factors indicating (a) term born with normal weight or (b) born with low birth weight or preterm, or both. Maternal education was coded into four categories (1 = lower secondary school, 2 = upper secondary school, 3 = lower college/university, 4 = higher college/university) as was maternal age (1 = 24 years and younger, 2 = 25–29 years, 3 = 30–34 years, 4 = 35 years and older) and number of children below age 6 years (1 = one [first] child, 2 = two children, 3 = three or more). *Psychological distress* was measured by a five-item version of the 25-item Hopkins Symptom Checklist (SCL-25; Hesbacher, 1980). The SCL-25 is a widely used self-administered screening instrument for detecting psychological problems, specifically symptoms of anxiety and depression in nonpsychiatric settings. The SCL-5 used here has been shown to perform similarly to the longer version (Tambs & Moum, 1993). Although the SCL was initially designed as a "state" measure, a range of studies have demonstrated that common psychological symptoms display considerable temporal stability and to a large extent reflect stable or traitlike aspects, partly due to genes (Nes, Roysamb, Reichborn-Kjennerud, Harris, & Tambs, 2007). We therefore used the mothers' SCL-5 scores from gestation week 17 as a proxy for their susceptibility to psychological distress. Mothers who completed the SCL-5 were asked to indicate on a 1–4 scale whether during the last 14 days they had been (a) not bothered at all, (b) bothered a little bit, (c) bothered "quite much," or (d) bothered very much by problems such as "Feeling blue" and "Worrying too much about things." The Cronbach's alpha was .77. Mean sum scores were computed, and, according to convention, a score of 2.0 was used as a clinical cutoff (Strand, Dalgard, Tambs, & Rognerud, 2003). This cutoff point has been shown to

constitute a valid indicator of mental disorder with prediction being somewhat better for depression than for other disorders (Strand et al., 2003).

Statistical Analysis

Data were analyzed using Stata/SE Version 12. Work absence in terms of nonemployment and long-term sick leave was prevalent. Associations were therefore estimated as relative risks (RRs) using Poisson regression (Greenland, 2004) rather than logistic regression and corresponding odds ratios (ORs). Compared to logistic regression, Poisson regression with robust variance has been shown to be a better alternative for analyzing cross-sectional data (no specified person-time) with binary outcomes because the prevalence estimates are more interpretable and easier to communicate. In addition, logistic regression might strongly overestimate the prevalence ratio when the outcome is common (Barros & Hirakata, 2003; Mcnutt, Wu, Xue, & Hafner, 2003), and confounding may not be appropriately controlled for (Barros & Hirakata, 2003; Zou, 2004). Because Poisson regression analysis of risk data tends to produce too-wide confidence intervals (CIs), we used the robust variance option in Stata to estimate crude and adjusted RRs with corresponding 95% CIs. Robust standard errors are generally recommended to correct for mild violations of underlying assumptions, and the procedure is relatively robust to omitted covariates (Zou, 2004). A strong assumption underpinning use of Poisson regression is *equidispersion* (i.e., variance equals predicted mean). The distribution of the outcome variables used in the present study did not indicate substantial overdispersion (i.e., means and variances were highly similar). For sick leave at child age 3, 4, and 5 years, means and variances were estimated as .136 and .117, .106 and .095, and .083 and .076. The corresponding estimates for employment status were .190 and .154, .161 and .136, and .143 and .123.

We also checked for potential multicollinearity by examining the variance inflation factors among the predictors in the model. No multicollinearity problems were indicated, as suggested by the variance inflation factor values, which were in the range of 1.0–2.06 (Allison, 1999).

We conducted two separate sets of analyses: the first using employment status and the second using long-term sick leave as the outcome because long-term sick leave is registered only for employed mothers in the National Insurance Administration. We estimated crude effects of child language impairment, behavior problems, and co-occurring language impairment/behavior problems on maternal employment status from child age 3 to 5 years and adjusted for potential confounding influences known to influence maternal work absence, child language impairment, and child behavior problems (i.e., preterm risk, child gender, maternal age, educational attainment, parity, and mothers' susceptibility to anxiety and depression). Long-term sick leave was examined for mothers who were employed in the given calendar years and adjusted for the same set of potentially confounding factors.

National registers contain information for the entire population and therefore allow for certain types of attrition and sensitivity analyses. To assess possible attrition bias, we compared the work absence rates of eligible MoBa mothers who responded to the 3-year questionnaire (*responders*, $n = 33{,}778$) with those who refrained from responding (*nonresponders*, $n = 27{,}826$). We also conducted sensitivity analyses using the multiple-imputation procedure in Stata. Register-based data on birth weight, gestational age, child gender, maternal age, educational attainment, and parity were used to impute language impairment for the nonresponders. Regression analyses were then run on the resulting sample of 61,604 mothers to examine differences in risk.

Results

Attrition and Sensitivity Analyses

Comparisons of the employment status of the 33,778 responders with the 27,826 nonresponders indicated a higher rate of nonemployment among nonresponders (Time 1 $[T_1] = 23.5\%$, Time 2 $[T_2] = 21.2\%$, Time 3 $[T_3] = 19.2\%$) than responders ($T_1 = 19.0\%$, $T_2 = 16.2\%$, $T_3 = 14.3\%$), with the difference shown to be significant at all three time points: $\chi^2_{T1}(1) = 187.70$, $p < .001$; $\chi^2_{T2}(1) = 251.17$, $p < .001$; $\chi^2_{T3}(1) = 264.77$, $p < .001$.

There was no difference in long-term sick leave rates between responders and nonresponders at the first assessment, but nonresponders had higher rates of long-term sick leave

($T_2 = 13.8\%$, $T_3 = 11.0\%$) than the responders ($T_2 = 11.5\%$, $T_3 = 9.0\%$) at child age 4 and 5 years, respectively: $\chi^2_{T2}(1) = 61.28$, $p < .001$; $\chi^2_{T3}(1) = 59.98$, $p < .001$. Thus, there were significant differences across mothers who continued to participate in the study and mothers who did not respond at child age 3 years, indicating better health and higher work participation among the responders.

Because register information was available for the entire MoBa cohort, we also conducted sensitivity analyses pooling data from the responders ($n = 33{,}778$) and nonresponders ($n = 27{,}826$). We imputed language impairment for nonresponders using register information on social background factors and child information from the MBRN. The risk estimates for maternal work absence were consistently, but only moderately, higher (difference in RRs: 0.05–0.10) in the total sample ($n = 61{,}604$) including the responders as well as the nonresponders, and the CIs were largely overlapping. Overall, the analyses suggest that attrition bias did not substantially bias the results, but the analyses presented in this article might provide somewhat conservative estimates of the associations between the child conditions and maternal work absence.

Descriptives

According to our impairment criterion, 4.2% of the children had a language impairment, and 1.6% of these children had co-occurring behavior problems. As expected on the basis of the low cutpoint, the prevalence of behavior problems was high and estimated to be 24.5% in the overall sample. Associations between child conditions and the various background factors are presented in Table 1. Not surprisingly, the prevalence varied across risk factors and was particularly closely related to maternal education. For mothers who had completed only lower secondary school, 9.3% reported that their child had either a language impairment or co-occurring problems, compared to 2.7% of mothers who had higher, university education. Likewise, mothers who reported a high susceptibility to psychological distress reported more behavior problems (38.2% vs. 23.6%) and more often co-occurring problems (7.7% vs. 4.0%). In addition, more boys than girls were reported to have both language impairment and co-occurring problems. Overall, the findings corresponded with findings from previous studies, although the total prevalence of language impairment in our sample was somewhat on the low side.

Data on employment and sick leave rates for the entire sample and the different groups of mothers separately are given in Table 2. The vast majority of mothers were employed at all three time points. The mothers increased their overall employment rate over time ($p < .001$). The proportion of mothers not gainfully employed decreased from 19.0% at child age 3 years to 16.2% and 14.3% at child ages 4 and 5 years, respectively. Although the overall employment rate increased for all groups over time, mothers who reported child language impairment or co-occurring problems had systematically lower employment rates than those who reported typical language development. The percentage differences in employment remained largely stable, ranging between 7.0% and 8.4% (language impairment) and 9.2% and 12.0% (co-occurring problems) across the 3 years.

The overall rate of long-term sick leave decreased significantly over time, from 15.3% at Year 3 to 11.5% and 9.0% at Years 4 and 5, respectively (see Table 2). There were no significant differences in sick leave rates across mothers at the first assessment, but differences were indicated at child age 4 and 5 years ($p < .001$), respectively. In regard to employment status, long-term sick leave was consistently and linearly associated with maternal age and education throughout the study period.

Regression Analyses

The Poisson regression results revealed that children's language impairment and behavior problems were important factors for maternal work absence. The results from the fully adjusted regression analyses are tabulated in Table 3 (employment status) and Table 4 (long-term sick leave). The fully adjusted RR estimates for nonemployment were significantly elevated for all groups who reported child problems with the exception of behavior problems at child age 4 years. The associations between maternal nonemployment and both language impairment ($RR_{T1} = 1.28$, 95% CI [1.15, 1.44]; $RR_{T2} = 1.25$, 95% CI [1.10, 1.41]; $RR_{T3} = 1.31$, 95% CI [1.14, 1.49]) and co-occurring problems ($RR_{T1} = 1.29$, 95% CI [1.13, 1.47]; $RR_{T2} = 1.23$, 95% CI [1.06, 1.43]; $RR_{T3} = 1.39$, 95% CI [1.19, 1.62])

Table 1. *Descriptive Statistics for Child Conditions and Background Factors*

	Typical development		Language impairment		Behavior problems		Co-occurring problems		
Background factors	%	*n*	%	*n*	%	*n*	%	*n*	*p*
Total prevalence	71.3	24,091	2.6	889	24.5	8,270	1.6	528	
Perinatal risk									***
Below 2,500 g	67.5	1,181	3.9	66	25.8	453	2.8	49	
Above 2,500 g	71.5	22,910	2.6	821	24.4	7,818	1.5	479	
Child's sex									***
Female	72.4	12,034	1.4	240	25.2	4,192	1.0	167	
Male	70.3	12,057	3.8	649	23.8	4,078	2.1	361	
Mother's age at birth									***
≤25 years	64.1	2,227	2.9	99	30.8	1,069	2.3	78	
25–29 years	71.1	8,213	2.2	254	25.1	2,903	1.6	184	
30–34 years	72.7	9,520	2.5	329	23.4	3,067	1.4	182	
≥35 years	73.1	4,131	3.7	207	21.8	1,231	1.5	84	
Educational attainment									***
Lower secondary	61.1	1,365	5.1	114	29.6	661	4.2	93	
Higher secondary	67.2	4,898	3.5	257	27.1	1,975	2.1	163	
Lower university	73.3	13,672	2.3	423	23.3	4,350	1.2	216	
Higher university	74.3	4,156	1.7	95	23.0	1,284	1.0	56	
Number of children									***
1	69.6	14,564	2.3	476	26.6	5,561	1.6	326	
2	73.8	8,549	3.2	366	21.5	2,491	1.6	179	
3 or more	77.3	978	3.7	47	17.2	218	1.8	23	
Maternal mental health									
Good	72.4	22,984	2.6	821	23.6	7,490	1.4	439	***
Poor	54.2	1,107	3.3	68	38.2	780	4.4	89	

***Difference across groups is significant at $p < .001$.

Table 2. *Work Absence Rates for Participating Mothers Having Typically Developing Children, Children With Language Impairment (LI), Behavior Problems (BP), or Co-Occurring Language Impairment and Behavior Problems*

	Total		Typical development		Language impairment		Behavior problems		Combined LI/BP	
Work absence	%	*N*	%	*n*	%	*n*	%	*n*	%	*n*
Not employed										
Child age 3 years	19.0	6,410	17.8	4,285	26.2	233	21.0	1,745	29.8	157
Child age 4 years	16.2	5,467	15.4	3,698	22.4	199	17.4	1,440	24.6	130
Child age 5 years	14.3	4,841	13.3	3,203	20.3	180	16.1	1,330	24.4	128
Long-term sick leave										
Child age 3 years	15.3	4,182	15.1	2,987	15.9	104	15.8	1,032	15.9	59
Child age 4 years	11.5	3,245	11.0	2,248	12.2	87	12.4	845	16.3	65
Child age 5 years	9.0	2,589	8.6	1,790	11.1	79	9.6	667	13.3	53

were moderate, whereas the RRs for behavior problems were rather small ($RR_{T1} = 1.08$, 95% CI [1.03, 1.14]; $RR_{T2} = 1.05$, 95% CI [0.99, 1.11]; $RR_{T3} = 1.12$, 95% CI [1.05, 1.18]). Of note is that even with the low cutpoint for behavior problems in this study, behavior problems alone were associated with a significant risk of not being employed at child aged 3 and 5 years (see Table 4). Maternal age (below 25 years), low educational attainment, and susceptibility to psychological distress (i.e., anxiety and depression) were all closely associated with

Table 3. *Nonemployment Among Mothers at Child Age 3–5 Years: Fully Adjusted Model*

		Time 1: Child age 3 years		Time 2: Child age 4 years		Time 3: Child age 5 years	
Predictor	*n*	RR	95% CI	RR	95% CI	RR	95% CI
Child condition							
None	24,091	1.00	Reference	1.00	Reference	1.00	Reference
BP only	8,270	1.08	[1.03, 1.14]	1.05	[0.99, 1.11]	1.12	[1.05, 1.18]
LI only	889	1.28	[1.15, 1.44]	1.25	[1.10, 1.41]	1.31	[1.14, 1.49]
Combined LI/BP	528	1.29	[1.13, 1.47]	1.23	[1.06, 1.43]	1.39	[1.19, 1.62]
Perinatal risk factors[a]							
Yes	1,750	1.07	[0.97, 1.17]	1.08	[0.97, 1.19]	1.12	[1.00, 1.24]
No	32,028	1.00	Reference	1.00	Reference	1.00	Reference
Child sex							
Female	16,633	1.00	Reference	1.00	Reference	1.00	Reference
Male	17,145	1.06	[1.01, 1.10]	1.06	[1.00, 1.11]	0.99	[0.94, 1.04]
Maternal age							
≤25	3,473	1.44	[1.33, 1.55]	1.28	[1.18, 1.40]	1.23	[1.12, 1.34]
25–29	11,554	1.04	[0.98, 1.12]	0.97	[0.90, 1.04]	0.98	[0.90, 1.05]
30–34	13,098	0.91	[0.85, 0.97]	0.92	[0.86, 0.99]	0.93	[0.86, 1.01]
>35	5,653	1.00	Reference	1.00	Reference	1.00	Reference
Maternal education							
< High school	2,233	2.13	[1.96, 2.32]	2.34	[2.14-2.57]	2.44	[2.22, 2.69]
High school	7,293	1.46	[1.36, 1.58]	1.58	[1.45, 1.72]	1.57	[1.44, 1.72]
Lower university	18,661	0.99	[0.92, 1.06]	1.01	[0.94, 1.10]	0.96	[0.88, 1.04]
Higher university	5,591	1.00	Reference	1.00	Reference	1.00	Reference
Maternal mental distress							
Yes	2,044	1.48	[1.39, 1.59]	1.47	[1.36, 1.59]	1.50	[1.38, 1.63]
No	31,734	1.00	Reference	1.00	Reference	1.00	Reference
Children below age 6 years							
1	20,927	1.00	Reference	1.00	Reference	1.00	Reference
2	11,585	0.89	[0.86, 0.95]	0.95	[0.90, 1.00]	1.00	[0.94, 1.06]
3+	1,266	1.46	[1.32, 1.60]	1.50	[1.35, 1.67]	1.59	[1.43, 1.78

Note. RR = relative risk; CI = confidence interval; BP = behavior problems; LI = language impairment.

[a]Perinatal risk factors include children born preterm (before pregnancy week 37) and low birth weight (<2,500 g).

risk of nonemployment, with the greatest risk estimated for low education (RRs: 2.13–2.44). Nearly 38% of those mothers who had only lower secondary school were not employed, compared to 15% of those who had a university degree (data not shown). Mothers who had three or more preschool-age children were also less likely to be employed (26.1%) as compared to those who had two (16.6%) or only one child (19.9%).

None of the child conditions were significantly associated with long-term sick leave at the first assessment (child age 3 years). At child age 4 years, the RR estimates for mothers who had children with co-occurring problems (RR = 1.31, 95% CI [1.04, 1.64]) turned out to be significant, whereas the risk estimates for pure behavior problems and pure language impairment were not significantly elevated. At the last assessment, at child age 5 years, both the RRs for mothers who reported either pure language impairment (RR = 1.24, 95% CI [1.00, 1.54]) and for mothers who reported co-occurring problems in their child (RR = 1.35, 95% CI [1.05, 1.74]) were significant. In addition, adjustment for the full set of background factors did not reduce the crude unadjusted RR estimates (data not shown) considerably, indicating that the effects of the control variables were relatively minor and the impact of the child conditions relatively independent.

Perinatal risk factors, including low birth weight and preterm birth (<37 weeks), were significantly associated with long-term sick leave

Table 4. *Long-Term Sick Leave Among Employed Mothers at Child Age 3–5 Years: Fully Adjusted Model*

	Time 1: Child age 3 years			Time 2: Child age 4 years			Time 3: Child age 5 years		
Predictor	*n*	RR	CI	*n*	RR	CI	*n*	RR	CI
Child condition									
None	19,806	1.00	Reference	20,393	1.00	Reference	20,888	1.00	Reference
BP only	6,535	1.00	[0.94, 1.07]	6,830	1.06	[0.98, 1.14]	6,940	1.07	[0.97, 1.16]
LI only	656	1.08	[0.90, 1.29]	690	1.11	[0.91, 1.35]	709	1.24	[1.00, 1.54]
Combined LI/BP	371	1.01	[0.79, 1.28]	398	1.31	[1.04, 1.64]	400	1.35	[1.05, 1.74]
Perinatal risk factors[a]									
Yes	25,991	1.21	[1.08, 1.35]	26,880	1.27	[1.12, 1.44]	27,480	1.24	[1.06, 1.43]
No	1,377	1.00	Reference	1,431	1.00	Reference	1,457	1.00	Reference
Child sex									
Female	16,633	1.00	Reference	14,038	1.00	Reference	14,252	1.00	Reference
Male	17,145	0.95	[0.91, 1.01]	14,273	0.99	[0.92, 1.05]	14,685	0.99	[0.92, 1.07]
Maternal age									
<25	2,365	1.54	[1.37, 1.73]	2,594	1.31	[1.15, 1.49]	2,721	1.59	[1.37, 1.85]
25–29	9,390	1.53	[1.39, 1.67]	9,782	1.34	[1.20, 1.48]	9,986	1.46	[1.29, 1.64]
30–34	11,016	1.27	[1.15, 1.39]	11,220	1.13	[1.02, 1.25]	11,413	1.27	[1.13, 1.44]
>35	4,597	1.00	Reference	4,715	1.00	Reference	4,817	1.00	Reference
Maternal education									
< High school	1,389	1.51	[1.31, 1.74]	1,486	1.94	[1.67, 2.26]	1,527	2.17	[1.83, 2.58]
High school	5,462	1.42	[1.28, 1.57]	5,710	1.62	[1.44, 1.82]	5,876	1.65	[1.44, 1.89]
Lower university	15,769	1.36	[1.24, 1.48]	16,227	1.38	[1.24, 1.53]	16,579	1.47	[1.30, 1.66]
Higher university	4,748	1.00	Reference	4,888	1.00	Reference	4,955	1.00	Reference
Maternal mental distress									
Yes	1,391	1.08	[0.96, 1.22]	1,498	1.34	[1.19, 1.52]	1,545	1.34	[1.17, 1.54]
No	25,977	1.00	Reference	26,813	1.00	Reference	27,392	1.00	Reference
Children below age 6 years									
1	16,765	1.00	Reference	17,474	1.00	Reference	17,930	1.00	Reference
2	9,667	0.68	[0.64, 0.73]	9,862	0.84	[0.78, 0.90]	10,009	0.93	[0.86, 1.01]
3+	936	0.60	[0.49, 0.73]	975	0.80	[0.65, 0.99]	998	0.99	[0.80, 1.22]

Note. RR = relative risk; CI = confidence interval; BP = behavior problems; LI = language impairment.

[a]Perinatal risk factors include children born preterm (before pregnancy week 37) and with low birth weight (<2,500 g).

throughout the period we investigated, as were young maternal age (24 years and younger), low educational attainment, and the mother's own susceptibility to psychological distress. The risk of long-term sick leave decreased systematically and linearly with higher age and higher education. Maternal susceptibility to mental distress was not associated with excess risk in the fully adjusted model at child age 3 years. At child ages 4 and 5 years, the risk was clearly significant, and the RRs were estimated as 1.34 at both assessments, suggesting that susceptibility to mental health problems becomes an increasingly important risk factor for long-term sick leave with increasing child age.

In short, the overall results presented in Tables 3 and 4 conform to the notion that children's special care needs inhibit mothers' careers in terms of consistently lower employment rates across preschool years and higher sick leaves as the child approaches school age. Disadvantaged mothers in terms of low education, young age, and vulnerability to psychological distress tended to be at particular risk.

Discussion

The present study is the first to show that some of the most prevalent problems in child development, namely, language impairment and behavior problems, in particular when they occur in combination, constitute putative risk factors of work absence among mothers of preschool-age children (3–5 years) in terms of both lower work

participation and higher long-term sick leave absence. Even with increasing employment rates across all mothers over time, the differences in employment rates between groups of mothers remained considerable and stable. Data on long-term sick leave indicated a decreasing trend in the overall sample and no differences between groups of mothers at the first time point. Significant differences in sick leave rates and risk estimates emerging at later stages—child ages 4 and 5 years—are consistent with the notion that tasks and strains involved in taking care of a child with language impairment, in particular when the language impairment co-occurs with behavior problems, is associated with compromised maternal health, resulting in long-term sick leave from work. This might be a result of persistent caregiving strains, but it might also result from additional challenges emerging over time. The transition to school age (which in Norway is 6 years) is often associated with intensification of child problems, caregiving demands, and challenges navigating access to support (Dockett, Perry, & Kearney, 2011; Janus, Kopechanski, Cameron, & Hughes, 2008). Language skills and well-adjusted behavior constitute important ingredients for optimal academic and social functioning, and parental stress might therefore become more pervasive at this developmental stage. An excess risk of not being gainfully employed and emerging between-group differences in long-term sick leave from child age 4 years might therefore partly reflect maternal responses to such stressors—with young mothers, mothers with less education, and those with a higher susceptibility to psychological distress being at particular risk. Of note is that previous research also indicates that mothers of older children with disabilities might experience a caregiver-specific respite effect from work (Morris, 2012), with mothers facing the heaviest caregiving burdens perhaps experiencing the largest relief from work. More in-depth studies to examine such processes over time are therefore warranted.

Higher work absence among mothers of children with language impairment and behavior problems is probably mediated by an array of putative mechanisms. On the basis of the relevant literature, stressors associated with the child's condition, including the mothers' own emotional and somatic responses as well as logistical challenges (i.e., scheduling and traveling to special educational service appointments), probably constitute primary factors. Previous research has, for example, indicated that negative family outcomes of children's communication problems are mediated by the use of devices, rehabilitation services, and multiple education services (Rogers & Hogan, 2003). A recent systematic review also indicated that greater responsibility for treatment management and/or less child self-care is associated with greater parenting stress across child disabilities and that parenting stress is closely related to poorer psychological adjustment in caregivers (Cousino & Hazen, 2013). Among mothers who are young and/or have low education, low tenure and less flexible work conditions are likely to contribute to excess risk of leaving paid employment.

It is important to note that the results must be understood within the Norwegian context. Macro-level factors such as social insurance systems and national policies clearly influence work absence rates, and cross-national differences in welfare systems are considerable (Allebeck & Mastekaasa, 2004). The unemployment rate in Norway is very low, and higher unemployment rates might strongly influence individuals who are employed. The welfare insurance system is regarded as fairly generous, and the costs related to sick leave and early retirement are double that of the Organisation for Economic Co-operation and Development (2012) country average—despite less pressing health problems than in many other countries. Scandinavian countries also differ from many other countries in that they have a long tradition of gender equality with respect to education, work participation, and child care. The corresponding legislation and policies are provided equally on a national level and widely respected by the population. As a consequence, women's total work participation is among the highest in the world, and affordable quality child care facilities are practically universally available, along with governmental sponsored health services to all citizens. Access to child care facilities and support services specific to their children's needs have previously been reported to be essential for promoting work–life integration for parents of children with special needs (Rosenzweig, Brennan, Huffstutter, & Bradley, 2008). In Norway, affordable quality day care is usually found from child age 1 year, and all children have a right to receive education and care in accordance with their aptitudes and abilities. Both day care and special education

are marked by a large degree of flexibility, variation, and decentralization, and the most typical feature of special education is that it takes place in ordinary kindergartens or preschools. Some countries have a more fragmented structure and quality of child care assistance than the Scandinavian countries. For example, as much as 60% of U.S. child care has been rated as being of "poor or mediocre" quality according to a National Institute of Child Health and Human Development (NICHD) study, and across nonparental care settings, less than 10% of toddlers receive positive caregiving according to NICHD criteria (e.g., NICHD Early Child Care Research Network, 2000; see also Helburn & Howes, 1996, and Johnson et al., 2005). The impact of child conditions on maternal work absence is therefore likely to vary across countries. However, the present study suggests that the availability of quality child care options and decentralization of special education services do not eliminate the excess risk of maternal work absence due to children's language impairments. This is also in line with findings from a previous study based on the MoBa cohort, which showed that previously employed mothers of children with behavior problems are at risk of leaving paid employment by child age 3 years (Nes et al., 2013).

The research literature on employment-related consequences of child disabilities indicates that mothers tend to rearrange their working hours, use up leave entitlements, work unsatisfactory work hours, and sacrifice their careers to balance their dual roles as "special" caregivers and employees (George, Vickers, Wilkes, & Barton, 2006). Corroborating these findings, the present study shows that mothers of children with language impairments—with or without co-occurring behavior problems—have higher work absence in terms of both nonemployment and long-term sick leave. Mothers of children with special care needs more generally, and language impairments more specifically, are therefore likely to become increasingly disadvantaged with regard to future employment prospects, career advancement, income, and pension benefits. Although more time with one's children might improve family well-being, maternal work absence is likely to undermine family economic security in the longer term, leaving the mother and her family particularly vulnerable to poor economic times and adverse effects of separation and divorce, a partner's loss of work, or compromised health. Extended career breaks might also lead to erosion of qualifications, reduced self-esteem, and a feeling of isolation, making return to work increasingly difficult (Holmes et al., 2012; Morris, 2012).

Strengths and Limitations

The use of a large body of prospective population-based cohort data linked to longitudinal register-based information affords this study many strengths. A majority of previous studies have used cross-sectional designs, or parental reports only, or have not included an appropriate reference group of mothers with typically developing children of comparable age (DeRigne, 2012; Gordon et al., 2007), which is vital to exploring the independent effects of specific child conditions on maternal work absence. Mothers of young children tend to be less stable in their employment and working hours than women with older or no children, and different developmental stages and child conditions are likely to introduce different caretaking challenges, in particular when children have special needs. Because of the prospective design, we were also able to adjust for the mothers' susceptibility to anxiety and depression during pregnancy. Susceptibility to anxiety and depression is fairly stable, partly due to genes (Nes et al., 2007), and constitutes an independent risk factor for work absence; it also influences maternal ratings of children's behavior (i.e., distortion or exaggerated ratings of problems). However, when we conducted the analyses on a subset of mothers without increased susceptibility to psychological distress, associations between the exposure and outcome variables were practically identical.

The present results also need to be interpreted in the context of some key limitations. First, longitudinal studies are subject to both ascertainment bias and attrition. The participation rate in the MoBa study is lower than optimal (40.6%), and mothers of higher age and education, those living in stable relationships, and those having healthy birth outcomes are overrepresented. However, associations of the various pregnancy exposures and birth outcomes in the study have not been shown to be considerably biased (Nilsen et al., 2009), and the overall employment rate in the cohort (81.0%–85.7%) corresponds fairly well with that of mothers of

young children in the general population (Bø, Kitterød, Køber, Nerland, & Skoglund, 2008). Nevertheless, some bias in terms of more highly educated respondents might render conservative RRs and probably causes an underestimation of the prevalence of the exposure, given that children with language impairment often come from environments characterized by low educational attainment, relative poverty, and parental stress (Horwitz et al., 2003). In line with these previous findings, the overall prevalence observed in this study (4.2%) is also somewhat lower than reported elsewhere (Horwitz et al., 2003). Of note is that the prevalence among mothers with only lower and higher secondary school education was closer to previously reported estimates (i.e., 9.3% and 5.8%, respectively). Second, our measure of language impairment was rather coarse and did not allow us to distinguish between specific types of language problems. We did, however, exclude all children registered as having severe congenital malformations and controlled for low birth weight and gestational age to reduce heterogeneity. Of note is that, despite the fact that we examined language impairment with or without co-occurring behavior problems and not disabilities more generally, the results might extrapolate to child disabilities in preschool-age children more generally. This should be explored in future studies. Third, it would have been ideal if we had been able to adjust for father's income or household income; however, because of the low response rate among fathers in the study this was not feasible. Most likely, the risk estimates for nonemployment would be greater among mothers having partners with a high income, who more readily can afford to reduce their work participation. Previous studies have, for example, suggested that reduction in gainful employment is most common in two-parent families (Breslau, 1983; Rogers & Hogan, 2003). Likewise, social support and personal coping resources (e.g., self-efficacy) are known to mediate the association between caregiving stressors and outcomes (Pearlin et al., 1990).

Concluding Remarks

The current study indicates that children's language impairments, with or without co-occurring behavior problems, have a sustained impact on maternal work absence. Mothers of children with language-related impairments are therefore likely to become increasingly disadvantaged with regard to future employment prospects, career advancement, and income development. Because pension entitlements are related to previous income, reduced labor market participation also entails reduced future pension. Children's language impairments are thus likely to have a range of negative short- and long-term consequences for the financial and overall well-being of mothers and their families, in addition to the loss of human capital and talent for companies and organizations. Much still needs to be learned about the specific mechanisms involved. Further examination of mediating mechanisms and transactions across social background factors, genetic influences, culture, and welfare systems is needed. Studies that use families as units and that explore social, organizational, and cultural norms and expectations might also prove particularly useful. In the present study we examined associations between mothers' work absence and language impairment and behavior problems in preschool-age children only. There is incontrovertible evidence of continuity between preschoolers' language impairment and later academic, social, and emotional adjustment. Future studies that explore the associations between children's language impairment and maternal work absence over extended periods of time is therefore warranted, as are studies that investigate specific sick leave diagnoses among mothers of children with special needs.

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